REMARKS

By this Amendment, claims 23, 36, 38, 41, and 45 have been amended. Claims 27 and 28 have been canceled without prejudice. Claims 23-26, 29-32, 34-38 and 40-49 are pending in the application. Importantly, independent claim 23 has been amended solely to incorporate features previously recited in dependent claims 27 and 28, now canceled. Accordingly, <u>no new issues are raised</u> by the present Amendment, and <u>the Amendment should be entered</u>.

Claims 24 and 49 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement for allegedly containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. Applicant respectfully traverses these rejections.

Claim 24 stands rejected on the ground that the added claim limitations of "analyzing the common eigen value signatures using a plurality of analytical tools to produce a plurality of analyses" and "subjecting the plurality of analyses to a hierarchy of classifiers to determine if an explosive or controlled substance is present in the object" do not comply with the enablement requirement. (Office Action, page 5). Applicant respectfully submits that the questions posed by the Examiner (Office Action, pages 5-6) do not correspond to the standard for determining whether the invention claimed in claim 24 is enabled by the specification under 35 U.S.C. § 112, first paragraph.

According to *MPEP 2164.01*, the standard for determining whether the specification meets the enablement requirement "has been interpreted to require that the claimed invention be enabled so that any person skilled in the art can make and use the invention without undue experimentation." *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404 (Fed. Cir.

1988). Factors to determine whether experimentation is undue include, but are not limited to:

(A) The breadth of the claims;

(B) The nature of the invention;

(C) The state of the prior art;

(D) The level of one of ordinary skill;

(E) The level of predictability in the art;

(F) The amount of direction provided by the inventor;

(G) The existence of working examples; and

(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure. *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404; *MPEP* 2164.01(a). "The examiner's analysis must consider all the evidence related to each of these factors, and any conclusion of nonenablement must be based on the evidence as a whole." *In re Wands*, 858 F.2d at 737, 740, 8 USPQ2d at 1404, 1407.

Applicant submits that claim 24 is supported by the embodiments disclosed in the specification such that any person skilled in the art can make and use the invention without undue experimentation. For example, in paragraph [0025], the specification gives an example of a combination analytical tools including "a combination of Principle Component Analysis, Wavelet Analysis, and Independent Component Analysis." Given this disclosure, other combinations would be enabled as well, for example, at least a combination any two of the three analytical tools described in the given example. Furthermore, analytical tools are described in the references listed in paragraph [0027]. Given this disclosure, which shows that the state of the prior art is quite advanced, one

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skilled in the art would be able to make and use the invention without undue experimentation.

Claim 24 is also enabled by the embodiment described in paragraph [0028], in which the specification describes an embodiment in which a "maximal rejection classifier 400 subjects the analyses received from classifier 300 to a hierarchy of classifiers that incorporate neural network technology and other support vector machines. For example, maximal rejection classifier 400 can include an iterative algorithm for non-time sensitive target change detection for explosive material in a non-explosive object." Applicant respectfully submits that, given this disclosure and the further disclosure in paragraphs [0029]-[0031] and FIGS. 2 and 3, one skilled in the art of neural network technology and support vector machines in general would be able to program an iterative algorithm without undue experiment. As long as the specification discloses at least one method for making and using the claimed invention that bears a reasonable correlation to the entire scope of the claim, then the enablement requirement of 35 U.S.C. 112 is satisfied. *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). Furthermore, neural networks and support vector learning are described in the references listed in paragraph [0027], which show the advanced state of the art.

Naturally, the level of ordinary skill in the art of neural network technology is quite high, which weighs in favor of a finding that a larger amount of experimentation would not be undue. Furthermore, it has been held that "[i]f two distinct technologies are relevant to an invention, then the disclosure will be adequate if a person of ordinary skill in each of the two technologies could practice the invention from the disclosures." *Technicon Instruments Corp. v. Alpkem Corp.*, 664 F. Supp. 1558, 1578, 2 USPQ2d 1729, 1742 (D. Ore. 1986). In the case at hand, with regard to the classifiers, a person of ordinary skill in the art is one of ordinary skill in the art of neural network technology, which is quite

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high. Unlike the chemical arts, the level of predictability of the art of neural network technology is quite high, which would lead to a conclusion that the amount of experimentation necessary would not be great.

Claim 49 is rejected on the ground that the added claim limitations of "forming a correlation function of the signature data" and "decomposing wavelets of the correlation function of the signature data" do not comply with the enablement requirement. (Office Action, page 6). Blocks S6 and S7 of FIG. 3 are characterized in the Office Action as "black boxes," implying that FIG. 3 does not enable the invention recited in claim 49. Applicant respectfully submits that FIGS. 2 and 3, with the accompanying description in the specification, enables the invention recited in claim 49 so that any person skilled in the art can make and use the invention without undue experimentation.

Applicant respectfully submits that blocks S6 and S7 of FIG. 3 are not "black boxes" in the traditional sense of the term, which are traditionally used to depict a portion of an apparatus, because FIG. 3 is a flow chart describing a process, not an apparatus. FIG. 3 is describing "an exemplary iterative function in learning mode." (Specification, paragraph [0031]). FIG. 2 is also a flow chart describing a process, specifically, "an exemplary iterative algorithm in running mode." (Specification, paragraph [0029]). FIG. 2 discloses that the iterative algorithm in running mode performs the steps show in boxes S1 and S1, i.e., formation of a correlation function of the signature and wavelet decomposition of the correlation function, respectively. (FIG. 2; Specification, paragraph [0029]).

Applicant respectfully submits that, given Applicant's disclosure, one skilled in the art of wavelet analysis would be enabled to program an iterative algorithm to form a correlation function of the signature and perform wavelet decomposition of the correlation function. Wavelet analysis and neural networks are described in the references listed in

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paragraph [0027]. Given this disclosure, which shows that the state of the prior art is quite advanced, one skilled in the art would be able to make and use the invention without undue experimentation. Furthermore, the level of ordinary skill in the art of wavelet analysis is quite high, which weighs in favor of a finding that a larger amount of experimentation would not be undue. Also, the level of predictability of the art of wavelet analysis is quite high, which would lead to a conclusion that the amount of experimentation necessary would not be great.

Applicants respectfully submit that claims 24 and 49 are enabled by the disclosure of the specification and respectfully request that the rejections be withdrawn and the claims allowed.

Claims 24, 48, and 49 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully traverses these rejections.

Applicant respectfully submits that, with regard to claim 24, the term "plurality of analytical tools" is not indefinite. The "plurality of analytical tools" are described in the specification as analytical tools applied by the classifier 300 to the signatures isolated by signal processor 200. (Specification, paragraph [0025]). In one embodiment, the analytical tools include "a combination of Principle Component Analysis, Wavelet Analysis, and Independent Component Analysis." (Specification, paragraph [0025]). The use of analytical tools is enabled by the specification as discussed above. Therefore, the meets and bounds of claim 24 is not vague, indefinite, or incomplete.

Claim 24 is alleged to be vague, indefinite, and incomplete in that it is not clear to the Examiner how and in what manner one would select the appropriate analytical tools,

modify the tools to fit a situation, and determine how to combine the results from the plurality of the analytical tools. (Office Action, page 7). Applicant respectfully submits that claim 24 is properly enabled as discussed above. Furthermore, selecting the tools, modifying the tools, and combining results from the tools are not steps that are claimed in the method of claim 24. Method steps that are not recited in claim 24 cannot be found to cause the metes and bounds of claim 24 to be indefinite.

The Examiner asserts that there is no proper antecedent basis for the phrase "the shielded apparatus" in claim 48. (Office Action, page 7). Applicant submits that antecedent basis may be found in claim 23, lines 3 and 4, upon which claim 48 depends.

The Examiner asserts that claim 49 is vague, indefinite, and incomplete because there is no adequate description of the specific elements within the blocks S6 and S7 in FIG. 3. (Office Action, page 7). Applicant respectfully submits that claim 49 does not claim "blocks S6 and S7 in FIG. 3." Claim 49 does claim "forming a correlation function of the signature data...[and] decomposing wavelets of the correlation function of the signature data," which is enabled as discussed above.

Claims 23, 36-38, 40-43, and 45 stand rejected under 35 U.S.C. § 103 (a) as being anticipated by U.S. Patent No. 5,114,662 ("Gozani"). This rejection is respectfully traversed.

Claim 23 recites, *inter alia*, "generating neutron particles from a plurality of neutron sources, each source having an intensity of about 10^7 neutrons/second or less." Gozani does not disclose this feature. In fact, Gozani does not disclose the intensity of the neutron sources at all. Furthermore, it would not be obvious to adjust the intensity of the neutron source to the level recited by claim 23 because a lower intensity of the neutrons makes it more difficult to detect explosives and controlled substances (specification, paragraph

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0003). Gozani does not disclose that the detector may detect gamma rays generated by "neutron particles from a plurality of neutron sources, each source having an intensity of about 10^7 neutrons/second or less" as recited by claim 23 and does not teach or suggest how to modify the detector to do so.

Also, claim 23 recites, *inter alia,* "determining that an explosive or controlled substance is present in the object when the relative atomic percentages of elements comprising the object are substantially similar to the relative atomic percentages of elements associated with known explosives and controlled substances." Gozani does not disclose this feature. The Examiner points out that Gozani teaches detecting "nitrogen and/or other elements." (Office Action, page 3). However, merely detecting more than one element is not equivalent to "determining that an explosive or controlled substance is present in the object when the relative atomic percentages of elements comprising the object are substantially similar to the relative atomic percentages of elements associated with known explosives and controlled substances" as recited by claim 23. Nor has the Examiner described why it would be obvious to do so. Therefore, the rejection of claim 23 cannot be maintained and the finality of the Office Action must be withdrawn.

Also, claim 23, as amended, recites, *inter alia,* "generating neutron particles from a plurality of neutron sources by pulsing the neutron sources simultaneously…and pulsing the neutron sources sequentially after determining that an explosive or controlled substance is present in the object." Gozani does not disclose these features, nor does the Examiner describe why it would be obvious to modify Gozani to do so.

Since Gozani does not disclose all the limitations of claim 23, claim 23 is not anticipated by Gozani. Claims 35-38, 40-43, and 45 depend from claim 23 and are

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allowable for at least the same reason. Applicant respectfully requests that the rejection be withdrawn and the claims allowed.

Claim 24 stands rejected under 35 U.S.C. § 103(a) as being anticipated by U.S. Patent No. 5,557,108 ("Tumer"). This rejection is respectfully traversed. The Office Action states that the reasons for this rejection are stated to be the same as those given for the 102(b) rejection of the 3/19/07 Office Action. (Office Action, page 8). Furthermore, the Examiner offers no explanation as to what limitations of claim 24 Tumer does not teach nor how it would be obvious to modify Tumer. Therefore, Applicant assumes this rejection is also under 35 U.S.C. § 102(b) and addresses it as such.

Claim 24, as amended, recites, inter alia, "analyzing the common eigen value signatures using a plurality of analytical tools to produce a plurality of analyses." Tumer does not teach or suggest this feature. The Examiner characterizes "the microprocessor" and "a system operator" as the analytical tools used to analyze the common eigen value signatures to produce a plurality of analyses. Applicant respectfully disagrees with this characterization because claim 24 recites that the common eigen value signatures are analyzed using a plurality of analytical tools. Tumer does not disclose that either the microprocessor or the system operator analyze common eigen value signatures. To the contrary, Tumer only discloses that "the microprocessor analyzes the data taken from each detector array," but does not disclose that the data taken are common eigen value signatures. (column 8, lines 13-15). Similarly, Tumer teaches that "the operator can review the data," but does not teach that the data are common eigen value signatures. (column 8, lines 18-23).

Furthermore, claim 24, as amended, also recites, *inter alia*, "subjecting the plurality of analyses to a hierarchy of classifiers to determine if an explosive or controlled substance

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is present in the object." Tumer does not disclose this feature. The Examiner characterizes the "user input list applied by the microprocessor and the criterion used by the human operator in making the final decision" as the hierarchy of classifiers. (Office Action, page 4). Applicant respectfully disagrees with this characterization because the Examiner has already characterized the operator and the microprocessor as the plurality of analytical tools. Assuming this characterization is correct, which it is not, the operator and the microprocessor, as the plurality of analytical tools, must use the criterion and the user input list, respectively, to generate the plurality of analyses. Tumer teaches that the microprocessor only produces one analysis, and that is "comparing the signature of every object within the container to a user input list of harmful or potentially dangerous materials." Similarly, Tumer teaches that the operator only produces one analysis, and that is the "review" of the data, presumably using the "criterion" the Examiner has identified. Tumer does not teach that the "comparing" and the "review," as the plurality of analyses, are then subjected to the "user input list" or "criterion," as the hierarchy of classifiers, a second time to determine if an explosive or controlled substance is present in the object. Therefore, the user input list and the criterion cannot be the hierarchy of classifiers as suggested by the Examiner.

Since Tumer does not disclose all the limitations of claim 24, claim 24 is not anticipated by Tumer. Applicant respectfully requests that the rejection be withdrawn and the claim allowed.

Claims 23, 25, 27-31, 34-38, 40-43, and 45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,080,856 ("Grenier") in view of Allyson. This rejection is respectfully traversed.

Claim 23, as amended, recites, *inter alia*, "generating neutron particles from a plurality of neutron sources, each source having an intensity of about 10^7 neutrons/second or less." Allyson and Grenier do not teach or suggest this limitation. To the contrary, neither Alyson nor Grenier teach or suggest an intensity of the neutron source. Furthermore, it would not be obvious to adjust the intensity of the neutron source to the level recited by claim 23 because a lower intensity of the neutrons makes it more difficult to detect explosives and controlled substances (specification, paragraph 0003).

Also, claim 23, as amended, recites, *inter alia*, "generating neutron particles from a plurality of neutron sources by pulsing the neutron sources simultaneously…and pulsing the neutron sources sequentially after determining that an explosive or controlled substance is present in the object." Neither Allyson nor Grenier disclose these features, nor does the Examiner describe why it would be obvious to modify either to do so. It should be noted that the newly added limitations of claim 23 are taken from claims 27 and 28, which previously depended on claim 23, and therefore do not necessitate a further search. The Examiner states, in the Office Action of 3/19/07, that Allyson discloses pulsing neutron sources simultaneously and sequentially. (Office Action of 3/19/07, page 10). Applicants respectfully disagree. To the contrary, Allyson only teaches "a single line of detectors," that "a second line of detectors 40 may be provided," and that "two separate measurements of the nitrogen concentration in the item of luggage 30 are determined." (column 6, lines 38-51). In order to determine the explosive at location 42 and at location 31, as shown in FIG. 4 of Allyson, the sources 22, 43 are activated. Allyson does not teach whether the sources 22, 43 are activated sequentially or simultaneously. The Examiner may be inferring from FIG. 4 of Allyson that source 22 is activated first to detect the explosive at location 42 and that sources 22 and 43 are then activated simultaneously to detect the explosive at location 31. Even assuming, *arguendo*, that this were the case,

activating one source and then activating both sources is not equivalent to activating the sources sequentially and then simultaneously. Furthermore, even if it were equivalent to activating the sources sequentially and then simultaneously, it does not meet the limitations of claim 23, which require "pulsing the neutron sources simultaneously...and pulsing the neutron sources sequentially after determining that an explosive or controlled substance is present in the object."

Since Allyson and Grenier do not teach or suggest all of the limitations of claim 23, and the Examiner has not explained why it would be obvious to modify Allyson and Grenier to do so, claim 23 is not obvious over the cited references. Claims 25, 26, 29-32, 34-38, and 40-47 depend from claim 23 and are patentable at least for the reasons mentioned above. Applicant respectfully requests that the rejection of claims 25, 26, 29-32, 34-38, and 40-47 be withdrawn.

Claim 49 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gozani or Tumer or Grenier in view of Allyson and further in view of Pentagon Report A669104 ("Sherlock"). This rejection is respectfully traversed.

The Supreme Court recently held in *KSR Int'l Co. v. Teleflex Inc.* that "the [*Graham*] factors continue to define the inquiry that controls a finding of obviousness." 550 U.S. __, 82 USPQ2d 1385, 1397 (2007). The *Graham* factors include determining the scope and content of the prior art, ascertaining differences between the prior art and the claims at issue, and resolving the level of ordinary skill in the pertinent art. *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). Applicant submits that the Examiner has not shown that the claims would have been obvious by conducting a full examination of the *Graham* factors. "Patent examiners carry the responsibility of making sure that the standard of

patentability enunciated by the Supreme Court and by the Congress is applied in each and every case." *MPEP* 2141.

Claim 49 recites, *inter alia,* "isolating common eigen value signatures of the substances contained within the object to generate signature data; forming a correlation function of the signature data; decomposing wavelets of the correlation function of the signature data; and comparing the incoming decomposed signature data with a library of signatures to determine if an explosive or controlled substance is present in the object." The Examiner states that Gozani or Tumer or Grenier in view of Allyson discloses the limitations of claim 49 except for wavelet analysis. (Office Action, page 10). The Office Action states that Sherlock teaches wavelet analysis for processing data from minefield detection systems and that it would be obvious to combine Sherlock with Gozani or Tumer or Grenier in view of Allyson. Applicant respectfully disagrees with these statements as discussed in greater detail below.

In *KSR,* the Supreme Court stated that "[r]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR,* 550 U.S. at __, 82 USPQ2d at 1396. In the case at hand, the Office Action has failed to make a *prima facie* case for obviousness because the Office Action has failed to articulate any rational underpinning at all. Instead, the Examiner has merely stated that wavelet analysis is "old and advantageous." This is merely a conclusory statement and cannot support a conclusion of obviousness.

Furthermore, Applicant respectfully submits that it would not be obvious to combine the teachings of Sherlock with Gozani or Tumer or Grenier in view of Allyson. In the first place, Sherlock is not in the same field of applicant's endeavor and is not

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reasonable pertinent to the particular problem with which the inventor was concerned. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Sherlock teaches applying a "wavelet based denoising algorithm" to "infrared video of mines in water," and not to compress the data   Therefore, Sherlock only teaches using a wavelet algorithm to reduce noise in an infrared video to visually identify a fixed target. The present invention, on the other hand, relates to a method of distinguishing explosives and controlled substances from confounders in transported object and includes generating neutron particles and detecting gamma rays to detect an explosive or controlled substance using the relative atomic percentages of elements comprising the object. Therefore, the only general issue that the present invention and Sherlock have in common is "finding something." This "similarity" is so broad that it is far outside the realm of "reasonably pertinent" to the Applicant's particular problem.

Because the Examiner has provided no rational underpinning to the conclusion of obviousness, and because the combination would not be obvious in any case as discussed above, the conclusion of obviousness with regard to claim 49 is incorrect and cannot be maintained. Applicant respectfully requests that the rejection be withdrawn and the claim allowed

In view of the above, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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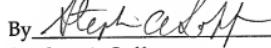
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